4.14   Fog

4.14.1 Hazard Profile

The American Meteorological Society Glossary defines fog as water droplets suspended in the atmosphere in the vicinity of the earth's surface that affects visibility. This occurs when air is cooled to its dew point or the amount of moisture in the air increases. Fog obstructs visibility depending on how densely packed the water vapor is within the cloud. Fog is often accompanied by light rain or light snowfall.

4.14.1.1 Magnitude/ Severity
The extent of fog is difficult to measure. It could be measured in terms of thickness or visibility. There is no official classification for the severity of fog, however, when fog is thick enough to obstruct visibility and delays or stops travel, it is considered dense or heavy fog. There are three primary types of dense fog: radiation (or ground) fog, advection fog, and frontal/precipitation fog.[75] The density of fog can vary drastically within a singular fog cloud dependent on a number of variables, including soil moisture, ambient temperature, and altitude. Additionally, fog can accompany other precipitation events, such as rain or snow, and can vary in density throughout the duration of the primary precipitation event.

4.14.1.2 Relationship to Other Hazards
Figure 4-150 shows the interrelationship (causation, concurrence, *etc.*) between this hazard and other hazards discussed in this plan update.

4.14.2 Impact and Vulnerability

Fog itself does not have a significant impact on buildings, infrastructure, health, and the economy. Fog becomes hazardous when it results in reduced surface visibility. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response.

4.14.2.1 Critical Facility and Infrastructure
The primary risks from fog involve the dangers of traveling under conditions of limited visibility. Fog resulting in vehicular crashes may also result in damages to infrastructure such as roads, facility buildings, and utility structures.

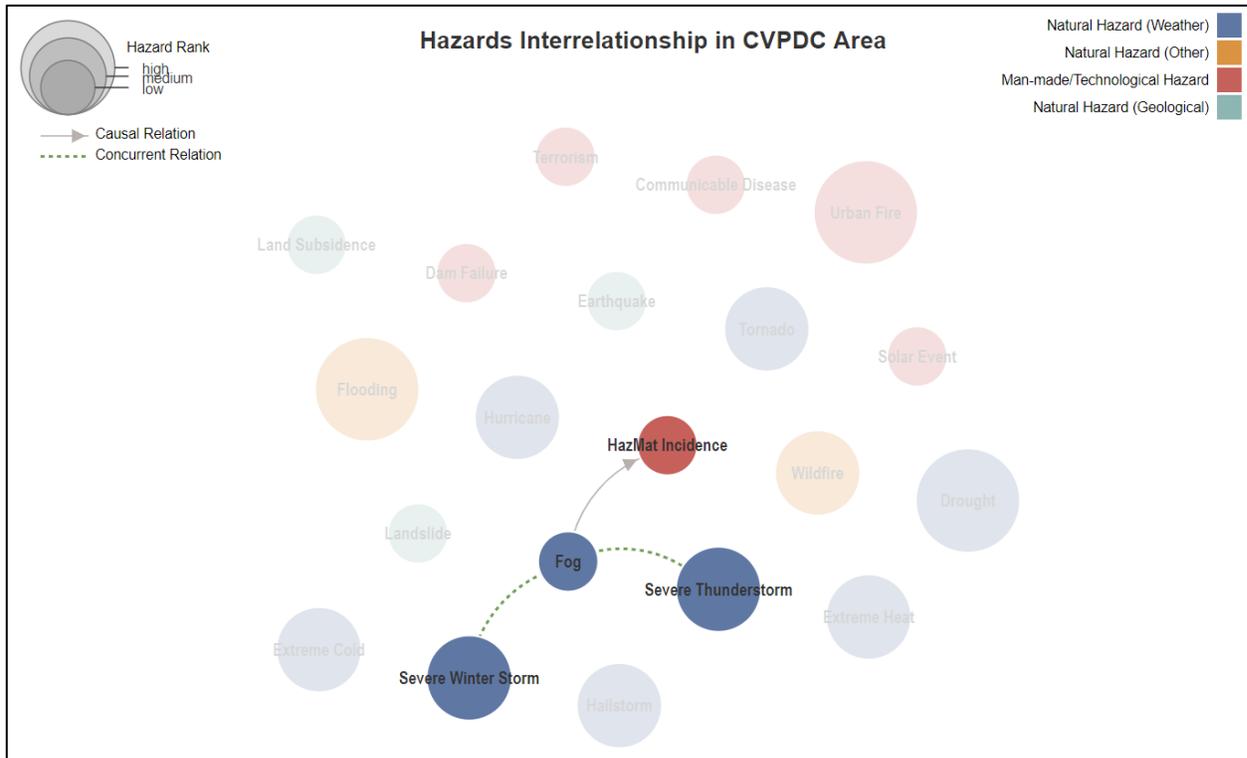[75] https://www.weather.gov/media/rnk/research/Dense_Fog_Study.pdf

Figure 4-150 Hazards interrelationship

4.14.2.2 Public Health

Fog on its own does not directly impact public health. However, fog may reduce visibility and can create dangerous traveling conditions. Transportation accidents involving a chemical release may cause great harm to the environment by releasing toxins into the soil, groundwater, or air.

4.14.2.3 Economic Impact

Fog can impact air, marine, and land transportation, including travel on rail and roadways. Financial losses associated with transportation delays caused by fog have not been calculated in the United States, but they are known to be substantial. The total economic losses associated with the impact of the presence of fog on aviation and land transportation can be comparable to that of other severe weather like tornadoes, winter storms, and hurricanes. Aviation is directly impacted by fog as visibility is critical for landing and takeoffs. (Figure 4-151 provides the location of airports in the CVPDC area.) The Federal Aviation Administration issues weather-related delays for commercial aircraft. The National Weather Service issues advisories for freezing fog events.

4.14.3 Risk Assessment

Locations at higher elevations are at particular risk of heavy fog incidence. Fog can occur almost anywhere during any season and is classified based on how it forms, which is related to where it forms. Certain seasons are more likely to have foggy days or nights based on a number of factors, including topography.
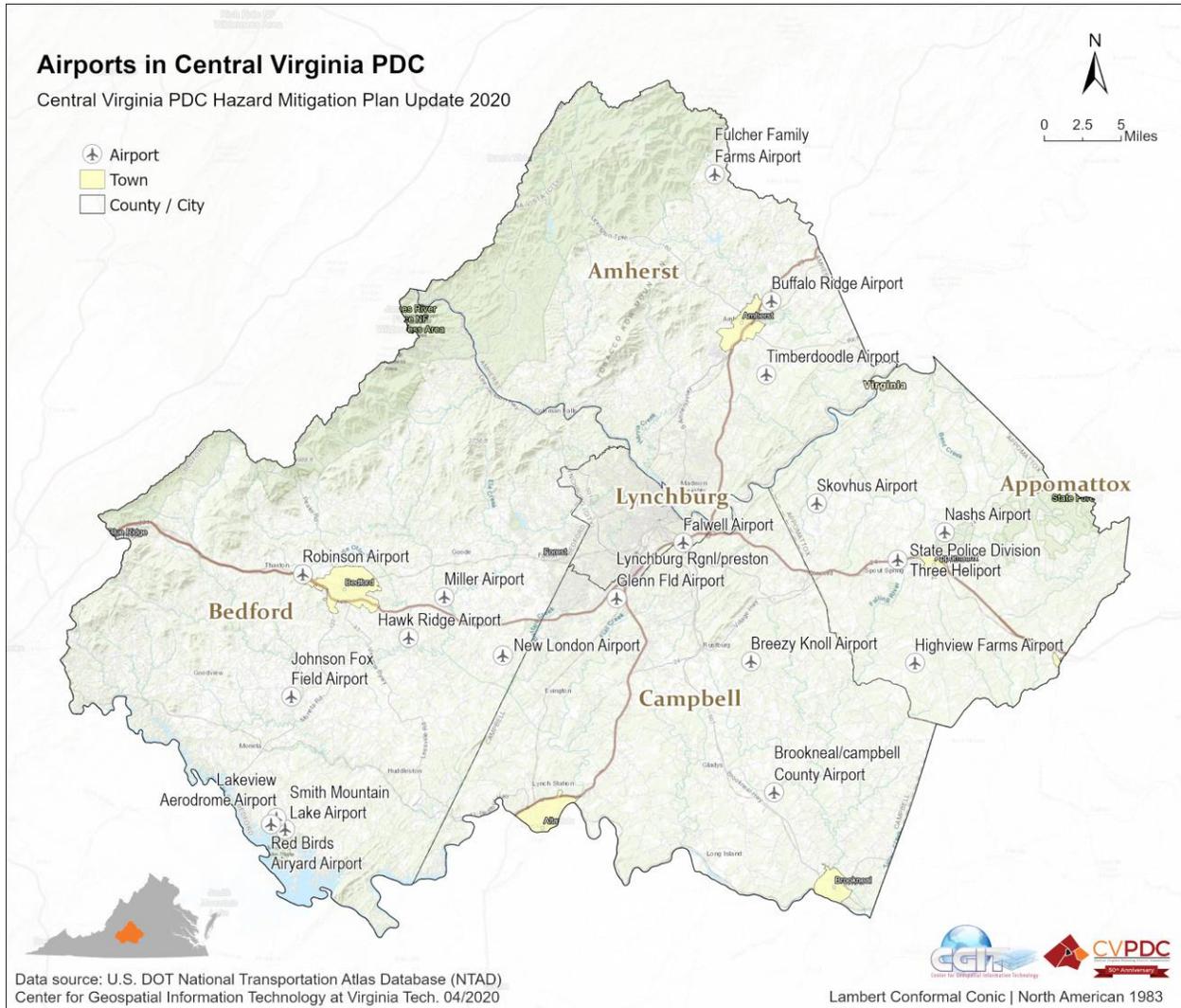
Figure 4-151 Airports in CVPDC Area

4.14.4 Probability of Future Occurrences

Although historical dense fog observation data are currently unavailable for the CVPDC area, it is known that this area, especially the City of Lynchburg, Bedford County, and Amherst County, experience fog fairly frequently. As a regular occurrence for the CVPDC area, the probability assigned for future fog events is highly likely.

4.14.5 References

- Cox, Robert E. *Applying Fog Forecasting Techniques Using AWIPS and the Internet.* Wichita, Kansas: National Weather Service, 2007. http://nwafiles.nwas.org/ej/pdf/2007-FTT1.pdf.
- LaDochy, Steve, and Michael R. Witiw. *Fog Hazard Mitigation*. In Encyclopedia of Natural Hazards, edited by Peter T. Bobrowsky, 338–42. Dordrecht: Springer Netherlands, 2013. https://doi.org/10.1007/978-1-4020-4399-4_350.

- Jackson, Jan, Ken Kostura, and William Perry. *Dense Fog Climatology for the Blue Ridge Foothills and Piedmont Areas of the Blacksburg, VA County Warning Area for the Period 1973 -2008.* NOAA Technical Memorandum. Blacksburg, VA: National Weather Service Office, February 2011. https://www.weather.gov/media/rnk/research/Dense_Fog_Study.pdf.